

Quarterly Report 9 – Public Page

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Project Title: Achieving Maximum Crack Remediation Effect from Optimized Hydrotesting
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Background

Hydrotesting is one of the key techniques widely adopted for pipeline integrity management. A dilemma is created when hydrotesting is performed on pipelines experiencing stress corrosion cracking: hydrotesting eliminates defects of critical size and conditions sub-critical cracks to achieve a post-test period without operating failure; adversely it shortens remaining life because of crack growth during hydrotesting even for small SCC cracks according to the latest research findings. This project is aimed to determine how effective hydrotesting is toward crack remediation. Specifically, efforts will be made to establish a working model that will allow the industry to predict the overall benefits of hydrotesting. When hydrotesting is necessary, the model will help pipeline operators select the hydrotesting parameters that would generate the most effective crack remediation.

Progress in the Quarter

Project activities undertaken through the 10th quarter focused on validating crack growth models using SCADA data and other field data key to crack growth and planning full scale tests.

In the previous reporting period, efforts were made in analyzing all the hydrostatic simulations completed so far to determine the role of crack depth, hydrogen, room temperature creep and loading procedure in the crack growth during hydrostatic testing of pipeline steels exposed to near-neutral pH aqueous soil environments. In the current reporting period, we have continued with work on defining hydrostatic loading conditions that would generate the most effective crack remediation. One of important findings in this period was the zero crack growth observed during hydrostatic loading when hydrostatic loading to 75% SMYS was completed over a length of 5 hour. When the loading period was shorter than 5 hour, crack growth during hydrostatic loading was found to increase with increasing loading time. On crack growth modeling side, a unified crack growth model predicting crack growth rate over a wide range of loading conditions and the occurrence of thresholds has been developed. The efforts on validating the crack growth model using SCADA data have been on-going over about two years. New approach to categorize

SCADA spectra has been proposed and is in the stage of developing. The full scale tests are in consideration.

Plans for Future Activity

- To focus on the validation of existing crack growth models applicable to hydrotests.